



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

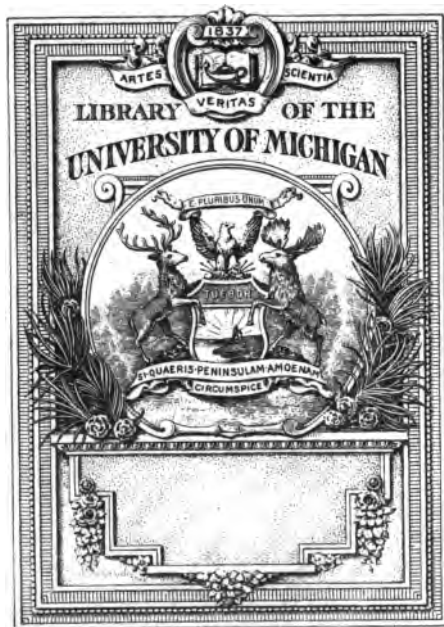
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



Astronomical
Observatory

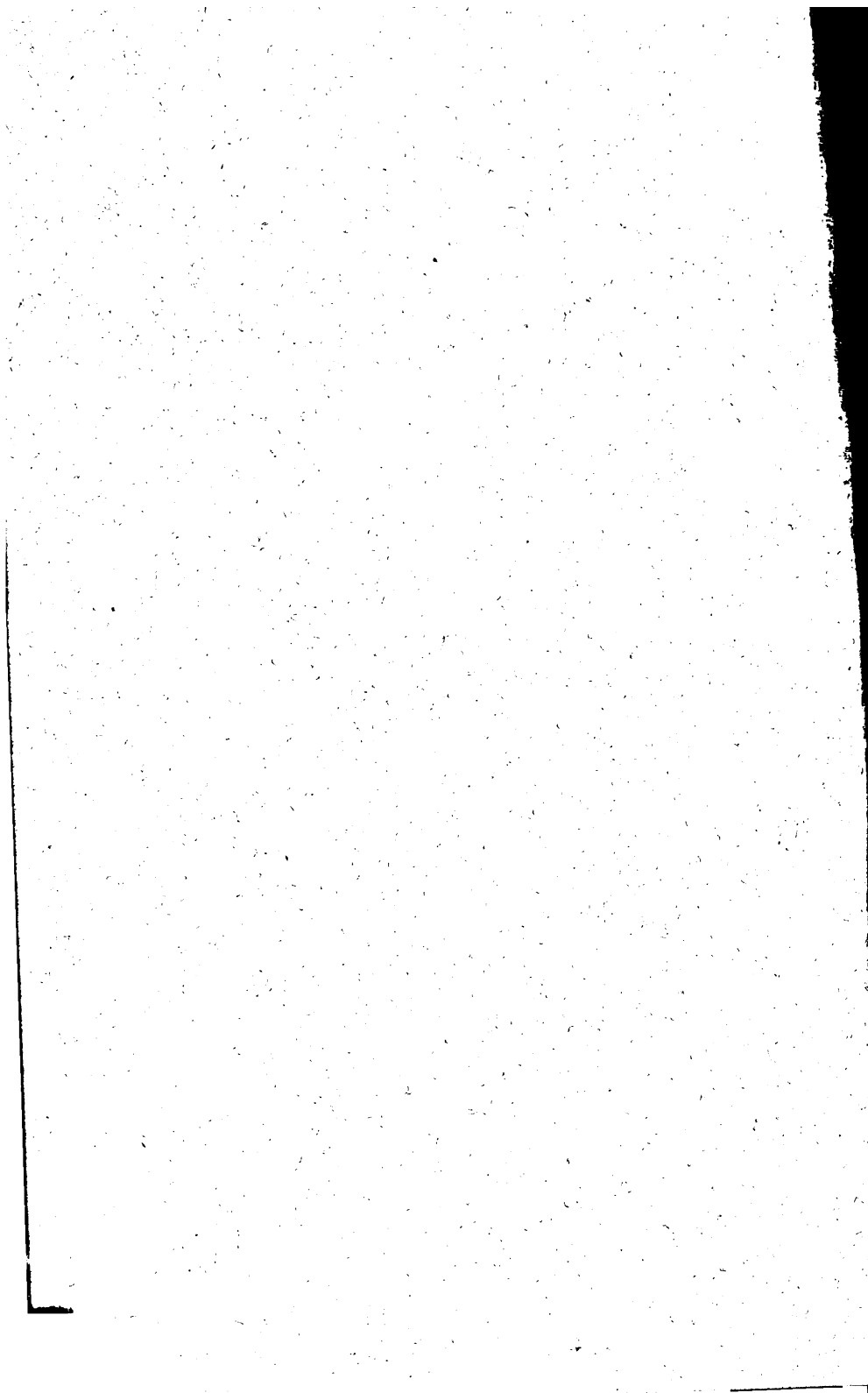
Astron.
Observ.

QB

36

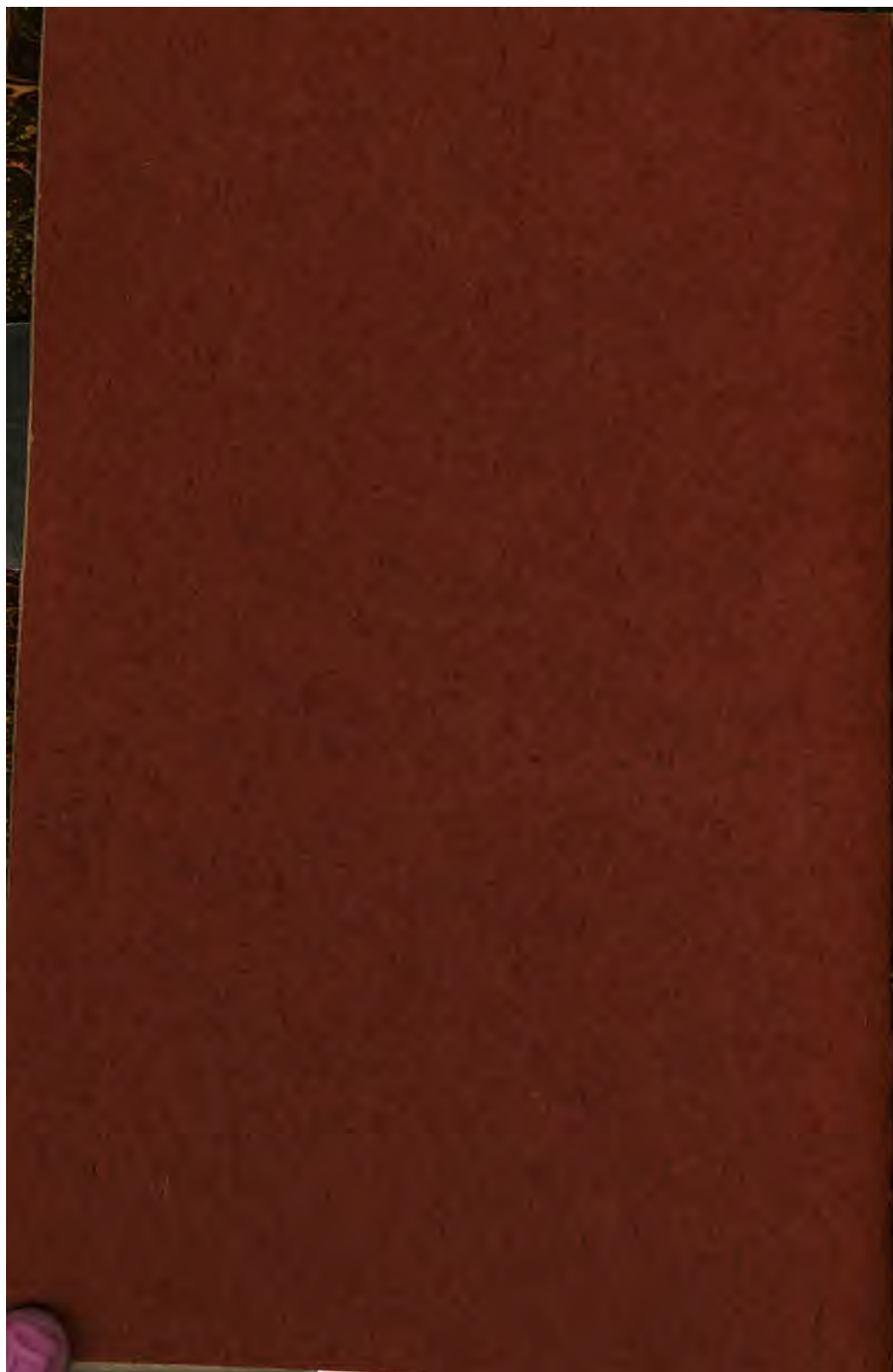
G7

A22



* ADDRESSES *

≡ Complimentary * Dinner ≡



31
ADDRESSES

AT THE

86460

COMPLIMENTARY DINNER

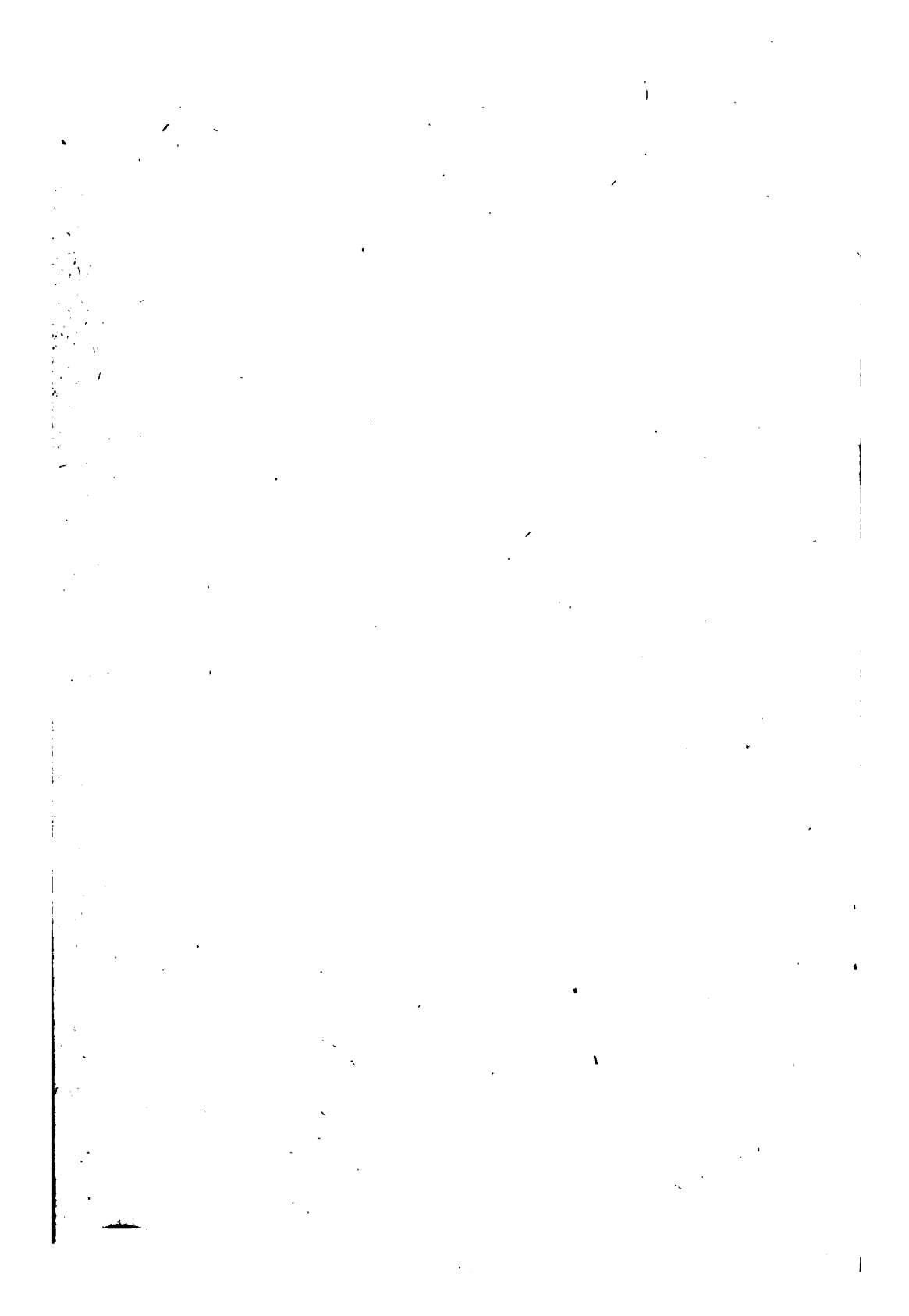
TO

DR. BENJAMIN APTHORP GOULD.

HOTEL VENDÔME, BOSTON,

MAY 6, 1885.

LYNN, MASS.:
PRESS OF THOS. P. NICHOLS.
1885.



ON the arrival of DR. B. A. GOULD from South America, his friends and fellow-citizens, desirous to give him welcome, and also for the purpose of testifying in some appropriate public manner their appreciation of his high service to science, and to mark the completion of his great work at Cordoba under the auspices of the Argentine Government, proposed a complimentary dinner. The accompanying correspondence took place.





BOSTON, *April 12, 1885.*

DR. BENJAMIN APTHORP GOULD :

Dear Sir,—We congratulate you on your safe return from South America, and ask that you will fix a date when it will be agreeable for you to meet us at a dinner, that we may welcome you home.

A. AGASSIZ,
JOHN F. ANDREW,
T. B. ALDRICH,
WILLIAM F. APTHORP,
JOHN V. APTHORP,
JERE. ABBOTT,
EDWIN M. BACON,
MARTIN BRIMMER,
FRANCIS BLAKE,
EDWARD BANGS,
GEORGE M. BROOKS,
JAMES FREEMAN CLARKE,
ROBERT CODMAN,
MELLEN CHAMBERLAIN,
S. C. CHANDLER, JR.,
C. F. CHOATE,
CHARLES J. CAPEN,
E. H. CLEMENT,
C. P. CURTIS,
F. J. CHILD,
ALVAN CLARK,
EDMUND DWIGHT,
J. S. DWIGHT,
CHARLES DEANE,
WILLIAM S. EATON,
W. L. ELKIN,
CHARLES W. ELIOT,

GEORGE E. ELLIS,
WILLIAM EVERETT,
CHARLES FAIRCHILD,
FRANCIS C. FOSTER,
HENRY W. FOOTE,
T. E. FRANCIS,
GEORGE L. GOODALE,
W. W. GOODWIN,
WOLCOTT GIBBS,
W. W. GREENOUGH,
E. W. GURNEY,
H. S. GREW,
O. W. HOLMES,
GEORGE S. HALE,
T. W. HIGGINSON,
H. A. HAGEN,
E. N. HORSFORD,
HENRY A. JOHNSON,
GEORGE M. LANE,
JOSEPH LOVERING,
JOHN LOWELL,
C. E. NORTON,
FRANCIS PARKMAN,
C. C. PERKINS,
H. PICKERING,
JAMES MILLS PEIRCE,
EDWARD C. PICKERING,

JOSEPH PEABODY,
F. E. PARKER,
H. G. PICKERING,
CHARLES F. PERRY,
JOSIAH QUINCY,
J. P. QUINCY,
S. M. QUINCY,
H. P. QUINCY,
J. P. REYNOLDS,
WILLIAM A. ROGERS,
J. C. ROPES,
SAMUEL H. RUSSELL,
W. G. RUSSELL,
L. SALTONSTALL,
G. M. SEARLE,
PHILIP H. SEARS,
A. J. C. SOWDON,
S. H. SCUDDER,
L. L. STIMPSON,
JAMES B. THAYER,
ROBERT C. WINTHROP,
EDWARD WIGGLESWORTH,
R. C. WATERSTON,
JUSTIN WINSOR,
EDWARD WHEELWRIGHT,
G. WIGGLESWORTH,
W. G. WELD.

ERVING WINSLOW, *Secretary.*

WOLLASTON, *April 15, 1885.*

My Dear Sir, — Your kind letter was the first which reached me on my arrival home, and I will not undertake to express in words the gratification which it has given me. Could anything enhance the delight of returning to one's own land, and to the companionship of old friends, it would be such a welcome, and I accept the invitation most gratefully.

Some reasons for a short postponement of the proposed reunion have been suggested to me ; and, as this would probably enable me to regain the strength which was somewhat impaired at the time of my leaving Cordoba, it might be well, should you approve, to fix some date in the early part of May. As I have no engagements whatever, you will perhaps have the kindness to select the day which may seem most convenient. With sincere thanks to my valued and cherished friends for this new token of their kind regard and remembrance,

I am, as ever, most cordially yours,

B. A. GOULD.

ERVING WINSLOW, Esq., *Secretary.*





PURSUANT to this arrangement a reception and dinner took place at the Hotel Vendôme, Boston, on the evening of May 6, 1885. The HON. LEVERETT SALTONSTALL presided, and, after the banquet, arose to introduce the guest of the evening. He spoke as follows:

This is a somewhat informal gathering of the old friends, associates in science, classmates and admirers of Dr. Gould — friends of his youth, as well as of his early and his later manhood — aye, his teachers, too, are here, for I see before me one, at least, in vigorous and active life, performing his duties as professor as he did forty years and more ago when we were in college. We have thus met that we may extend to Dr. Gould our most cordial welcome, to show him our high respect for his character and attainments, to express to him our deep sympathy for all the severe trials he has been called upon to encounter, and to prove to him in every possible way how proud we are of his high fame, world-wide, as one of the greatest astronomers of this or any former age.

How well I remember him in college in the freshman year, the chum of one who has also become eminent in the field of litera-

ture! What was there in that suite-room No. 9 Holworthy which kindled the spark and fired the train of these two lads to do the great work and persist through every obstacle in winning the crown which now encircles their brows? With what heart-felt emotion do we recur to those dear old college days! The strong feeling which then bound classmates together is, I fear, fast dying out, and I regret that it is so. Well do I recollect the youthful Gould at his first examination in mathematics. We two were left alone in the room to undergo that dread ordeal; we had both stood high on Prof. Peirce's record, and were reserved as a sort of *bonne bouche* for the "grave and reverend signors" who composed the committee of examination; we had the stiffest problems in the book to solve. We stood before the board, and, alas! the contemplated dish of sugar turned to gall and vinegar. We "deaded." Now mark the different effect of this on the two boys! While to the one the very sight of a mathematical book became forever after a horror,—the very most hateful object in the world,—the other was fired with ambition and determined not only to succeed, but to excel.

I note on the "Order of Performances for Exhibition" in May, 1843, that the classics still claimed him for their own, for he had the part assigned him—I see by the paper I hold in my hand—*Περικλῆς Ἀθηναῖος*. But a year after, if my recollection serves me rightly, he had bid a long farewell to the Athenian, and had a mathematical subject assigned him. At Commencement, a disquisition, "The Infinite in Mathematics," showed that his intellectual voyage had begun, his prow was already pointed to that infinite world of science, and that he was even then taking observations which have enabled him, after forty years of brave, heroic work, to come back to us to receive the crown he so richly

deserves. I cannot even allude to the vast amount of invaluable work which has been accomplished by Dr. Gould. His four years after graduating, devoted to study under the most distinguished scholars of Germany, France and England, followed by fourteen to fifteen years on the United States coast-survey and to the telegraphic (or chronographic) method of determining longitude, his stealing of a march on the English mathematicians in determining the longitude between the two continents after the laying of the cable, his statistics of the sanitary commission, his work at Albany, valuable as it was unrewarded, would seem quite enough to fill the life-work of a scientific man; but it was all mere preparation for further work to the perpetually youthful, buoyant, aspiring nature of our illustrious guest; and when the opportunity presented itself for doing a far greater work than that, in my opinion, accomplished by any astronomer now living, and equaled in extent and importance by but few in any previous age, a work so vast in its design that its mere suggestion might well have staggered a much younger man, he already having passed what is considered the prime of life, courageously took the great step and exiled himself from home, conscious that it was a work which he could scarcely hope to live to complete. He buried himself in a country so far away and so little known that it might well have seemed another world, and with no hope of reward such as the world generally values, all for the cause he loves with such devotion — the cause of science. He sailed with his family for Buenos Aires, and there for fifteen years he has been searching the heavens by night, and making his calculations by day, till he has finished a complete catalogue of the stars of the southern hemisphere. And in this great work, the greatest perhaps ever

known, an exile from home, almost alone and unaided, feeling that on the continuance of his life and strength depended its accomplishment, he braved and endured all with a courage and devotion worthy of our highest admiration.

At last it was done ; he was to return to his beloved country. Then his strength failed ; his hand could not return the kindly farewell grasp of his new friends ; but his brave, heroic act of self-sacrifice was rewarded, his noble work was complete, and will place him for all time, in the opinion of men of science, not only of this, but of future generations, in the company of Copernicus, Kepler, Tycho Brahe, Galileo, Newton, Laplace, Bessel and Argelander.

Truly are we honored in having him for our fellow-citizen, our friend, and (some of us) our classmate. He has come back to us fresher and younger than any of his contemporaries, ready for new work, and ambitious for new fields to conquer (cheers and applause), his eye as keen, his brain as clear, and his heart as young and warm as ever, (renewed applause).

Mr. Saltonstall, while speaking, was interrupted by frequent and hearty applause. And now, he said, —

I give you the health of DR. GOULD, — May many more years of usefulness be his.

As the applause which followed Mr. Saltonstall's remarks subsided, Dr. Gould rose, his rising being the signal for renewed applause. Dr. William Everett proposed three cheers, which were given with a will by the company, standing. Dr. Gould spoke as follows :

My Dear Friends: — Would that I knew how to give some fit expression to my deep sense of your kindness, and to my gratitude for this delightful manifestation of your approval and regard. No man could fail to be profoundly moved, or to indulge a pardonable pride, under such circumstances ; and it is only natural that one, who is perhaps too sensitive to the opinions of those whom he loves and esteems, should find it difficult to control his emotions or to give full utterance to his thanks.

If the pursuance of my appointed task has entailed sacrifices, the chief among them has certainly been the long separation from the friends at home, whose companionship, encouragement and sympathy were always my greatest source of happiness, outside the narrow limits of domestic life. But there has been something more than mere separation ; for, however cherished and abiding may be our memory in the hearts of the friends spared to us for that reunion to which we are always yearningly looking forward, there still remains the consciousness that we have ceased to form an element in their lives, and that all human associations become dulled by the lapse of time. Had I been able to foresee this welcome from those to whom I am most closely bound by ties of affection, sympathy and respect, the anticipation would have lightened many a weary hour, and given new strength when courage threatened to fail.

You, my dear classmates of forty years ago, like the other friends around us here, need not be reminded that public speaking was never comprised in the short list of my attainments. It will not surprise you that fifteen years' disuse of our native language should have given me no greater command of it, nor that an unremitting employment of telescopes and logarithm-tables should have made it no easier to face a large assemblage, even

though composed only of kind and indulgent friends. All that I can do is to offer to all of you my overflowing thanks, and to assure you that the long severance from friends and country, now at last ended, shall give greater earnestness to my resolve to atone in the future, as well as may be, for the past neglect of my duties to them and to this community, in which I will never abdicate my priceless birthright.

As you have implied in your too flattering words, that incentive has never been wanting during my expatriation, which came from the consciousness that whatever it might be within my power to accomplish well, would be credited in part to our native land. It is a source of pride to the Argentines that their political organization was modeled upon that of the United States,—that their precedents in constitutional law are based upon the decisions of North American courts, and that the word “America” vibrates in their ears with the same melody we know so well. If a conquest from the realm of the unknown be made by American effort, they rejoice in it, before considering which is the hemisphere whence the soldiery came. And the success of any laudable effort emanating from this western hemisphere is doubly prized by them when the two Americas have united for its accomplishment.

Science knows no narrow bounds of nationality; yet who would be so cruel or so unwise as to censure, or attempt to weaken, the intense stimulus which is given by the hope that what honor may attach to a good work will be reflected upon one's own country? Does not a part of the world's tribute to a Franklin, Fulton, Bache, Henry, Agassiz or Peirce—to an Irving, Bryant, Prescott, Motley or Longfellow (I name only such as have left us)—belong to their country? And is it not a

wholesome incentive to the laborer that he should feel that a portion of his reward will be assigned to his country, or even in a wider sense, to his own continent, when this has started late in the race, handicapped by the shortness of its history and the restrictions of its past opportunities?

From this point of view it may not be unseemly if I comply with the request to relate briefly what has been attained at Cordoba in these fourteen and a half years, chiefly by North Americans, laboring in the service of the Argentine nation, which has never failed to afford them all needful support and encouragement.

The undertaking began, as you know, with the project of a private astronomical expedition, for which my friends in Boston and its vicinity had promised the pecuniary means. The selection of Cordoba, as an especially desirable place, was chiefly due to our lamented countryman, Gilliss, whose astronomical mission to Santiago de Chile had resulted in extensive and valuable observations of southern stars, and in the establishment of a national observatory, while it had enabled him to form a sound judgement as to the relative advantages of different points in South America for astronomical purposes, notwithstanding the total want of trustworthy meteorological data. This choice of place was confirmed by the counsel of the Argentine Minister to this country. That minister was Sarmiento; a man who needs no encomium here, for, during his brief residence in the United States, he gained an exceptional number of friends and admirers. He transmitted to his Government, then under the presidency of General Mitre, my application for certain privileges and assurances, all of which were at once cordially conceded; but his interest in the plan became furthermore so great that when, soon

afterwards, he was himself elected President, he obtained the assent of the Argentine Congress to the establishment of a national observatory, and wrote asking me to change my plans accordingly. The official invitation was sent in due time by the Minister of Public Instruction, Dr. Avellaneda. The Government assumed the expense of the instruments and equipments already bespoken, and authorized the engagement of the requisite assistants.

In 1874 Dr. Avellaneda succeeded Sarmiento in the presidency, and in 1880 he was himself succeeded by General Roca. Thus, four successive administrations have encouraged and sustained the undertaking; and, notwithstanding the high political excitement which often prevails, and might easily have disinclined the members of any one party to give cordial aid to institutions established or fostered by its opponents, there has never been wanting a spirit of decided friendliness to the Observatory and to the scientific interests which have been developed under its auspices. No president of the nation, and no minister of the department under which the observatory is placed, has failed to give strong practical evidence of his good will; there has been none of them to whom I do not owe a debt of gratitude; I have never made an official request which has not been granted, and almost always in such a way as to enhance the favor. And, just as the official founders of the observatory met us with a cordial welcome on our arrival, so the Government of to-day has overwhelmed me with kindness and tokens of regard on my departure. On the very last evening before embarking, — when it was my privilege to receive the farewells of a crowded assemblage in the halls of the Argentine Geographical Institute, and to hear words of sympathy and commendation from the lips of

General Sarmiento, my earliest Argentine friend, speaking in behalf of that Society, — I replied, in the few words which alone were possible at the time, but with all sincerity and truthfulness, as follows :

“ It was you, sir, who provided the opportunity for which I was yearning; it was the Argentine Republic which made it easy for me to avail myself of it; it has been the National Government which, in its various phases, and under so many different administrations, always provided all needful means and resources; it is the Argentine people which has accompanied me in my tasks, giving support by their sympathy, and incentive by their kindness.”

The original purpose of the expedition was to make a thorough survey of the southern heavens by means of observations in zones between the parallel of 30° and the polar circle; but the plan grew under the influence of circumstances, until the scrutiny comprised the whole region from the tropic to within 10° of the pole — somewhat more than 57° in width, instead of 37° . Although it was no part of the original design to perform all the numerical computations, and still less to bring the results into the form of a finished catalogue, it has been my exceptional privilege, unique in astronomical history so far as I am aware, to enjoy the means and opportunity for personally supervising all that vast labor, and to see the results published in their definite, permanent form. Of course, this has required time. The three years which I had purposed devoting to the less complete work have been drawn out to nearly fifteen; and you will comprehend what that implies for one who loves the friends of his youth, his kindred and his country. Yet even here there has been consolation. For, while the work has demanded all that period, it did not absorb the whole time, and opportunity was left for other

studies. Among the astronomical ones it has been possible to examine all the stars as bright as the seventh magnitude, up to 10° of north declination, for careful estimates of their respective brilliancy, and to reform the arrangement and boundaries of the southern constellations. Also to carry out the observations and computations for another stellar catalogue, more precise than that of the zones, and extending over the whole southern hemisphere. The total number of stars in this catalogue is less than in the other; but that of the observations is greater, since each star has been observed several times, as well as with greater precision. This catalogue, too, is at last finished and in the hands of the printer, and thus it is that I am once more at home with you, my cherished friends.

I am hopeful that the data now collected may throw some additional light upon the great problem of the distribution of the stars in space. Yet, even should these prove insufficient, there is reason to believe that the new labors, already begun by my successor, Dr. Thome, who has been connected with the observatory from the very first, will provide whatever additional information may be needful for the purpose. Among the other researches which have gone forward, while the preparation of the zone-catalogue dragged its slow length along, has been a study of the meteorology of the country. The absolute lack of information on the subject had forced itself unpleasantly upon my notice when endeavoring to select the most suitable place for the observatory; and, as it would have been disgraceful for any scientific inquirer to reside in the country without trying to supply the want in some degree, I succeeded in enlisting the aid of various educated men and women in different parts of the country and adjacent ones. The Government and Congress acceded to my recom-

mentation that a modest sum should be annually appropriated for the purchase of barometers, thermometers, rain-gauges, etc., to be lent to volunteer observers, and for arranging, computing and publishing the results. In this way was organized, in 1872, the Argentine Meteorological Office, which has established no less than fifty-two stations, scattered from the Andes to the Atlantic, and from Bolivia to Tierra del Fuego. At the end of the year 1884 there were already twenty-three points at which the observations had been continuously made, three times a day, for at least four years, and sixteen others at which they had already been continued for more than two years. These have provided the necessary data for constructing the isothermal lines, with tolerable precision, for all of South America from the torrid zone to Cape Horn. Some little has also been accomplished in determining local constants of terrestrial magnetism; and our determinations of geographical position have nearly kept pace with the extension of the telegraph-wires. The beats of the Cordoba clock have been heard and automatically recorded amid the plash both of Atlantic and Pacific waves. And the series of longitude-determinations made by the United States naval expeditions, between Buenos Aires and Europe on the one side, under Captain Green, and between the United States and Valparaiso under Captain Davis on the other, give, when combined with the two South American measurements, values for the longitude of Cordoba, which differ only by one-sixth of a second, — this being the total amount of the aggregate errors of the several determinations in a series which, passing through Brazil, the Cape Verde Islands, Madeira, Portugal, England, Ireland, Newfoundland, the United States, Central America, and down the

coasts of Ecuador, Peru and Chile, completes the full circuit at Cordoba again.

But I will not descant upon collateral matters, nor convert this gathering of friends into an astronomical lecture-room. There are but two points more that I wish to mention.

One is, that I cherish a hope that our sojourn at Cordoba may hereafter be considered as marking an epoch in a new method of astronomical observation, namely, the photographic. The inception and introduction of this method belongs to our countryman, Mr. Rutherford; and it was only through his friendly aid in several ways that I was enabled to give it a larger scope, in spite of many obstacles. Now I can report that every important cluster of stars in the southern hemisphere has been repeatedly photographed at Cordoba with a precision of definition in the stellar images which permits accurate microscopic measurement; that these measurements are at present actively going on, and that the Argentine Government has undertaken to provide the means for their continuance under my supervision. It may be that I overestimate the importance of this new method; but I confess that my expectations are very high. Another year ought to show us whether they are exaggerated or not.

The other point is, that a very large share of the merit which you so liberally attribute to me belongs to the faithful staff of fellow workers, with whose assistance I have been singularly favored. Their unselfish devotion to the great undertakings in which they took part, their loyalty, trustworthiness and ability, have, in the great majority of cases, been beyond all praise. Happily, their faithful and inestimable services to science are placed on durable record; and yet unborn astronomers will know, at least in part, how great have been their deserts. The senior

of them, Dr. John M. Thome, whose services began in 1870, before we started southward, is now director of the Observatory, where he has begun a new and important work, which will do honor to him and to the institution. Another, Mr. Walter G. Davis, who has labored most earnestly and efficiently for eight and a half years, is now director of the Meteorological Office, which is assuming large proportions, and under which he is now organizing at Cordoba a meteorological station of the highest class. One noble young man, Mr. Stevens, was summoned, without an instant's warning, to a higher reward than earth could give, leaving no memories behind him other than of affection, admiration and respect. It was a sore loss for us, and for the bereaved parents in New Hampshire, to whom he was their only earthly stay and staff. Had he lived, his friends and country would have had abundant cause for pride in him. As it is, the number of those who love and honor his memory may perhaps be smaller, but their pride and admiration are no less, than had they seen the full harvest instead of the rich promise only. Mr. Bachmann, a native of Austria, who labored with us for more than ten years, is now at the head of the Argentine Naval Academy in Buenos Aires, with more than three hundred pupils and an elegant little observatory, where he finds repose from administrative cares, in astronomical work analogous to that to which he gave his energies at Cordoba. He has already undertaken some longitude-determinations and arranged a time-ball, which is probably by this time giving daily signals by which the shipping in the outer roads, twelve miles away, may correct and rate their chronometers.

I have spoken longer than I intended, but will make no apologies, for I know your friendly indulgence. It only remains to

say, for these Argentine scientific institutions, that I believe their success is now assured. They will enter upon new and enlarged fields of usefulness, as indeed they ought, for the world moves. And for myself, that the remembrance of this occasion and of your goodness will be a source of pride to me through life, and to my children afterwards.

Hardly had the sound of Dr. Gould's voice died away when he was the recipient of a splendid ovation, the guests of the evening seeming to vie with each other in a generous rivalry as to which should outdo the other in rendering honor to the distinguished guest of the evening. When silence had been in a measure restored, Mr. Saltonstall said he had found, in looking over some old papers, an old programme dated May, 1843, of some exercises which took place at Harvard College at that time. On that programme he found assigned to Dr. Gould, who was at that time a student, the subject of "*Περικλής Αθηναῖος*" in a disquisition. He simply desired to recall the circumstance for the purpose of calling the attention of President Eliot to the remarkable fact that a Greek scholar, who had a Greek part assigned to him, should also become a famous mathematician. Mr. Saltonstall also took occasion to remark that under President Eliot's management Harvard College had made greater progress than it had for a hundred years prior to his advent in the presidential chair. "We owe him," said he, "a deep debt of gratitude, and I have felt moved to say, in regard to new departures,

‘Festina lente’ (applause), but I give you, gentlemen, the health of PRESIDENT ELIOT of Harvard College.”

Mr. Eliot, on rising to respond to the toast, received a warm welcome. He said :

Mr. President and Gentlemen,—I suppose one reason why Dr. Gould gave a good deal of time to the study of Greek when he was in college, was that it was a required study then, and he had to (applause). But the University congratulates itself on the result of the training which it gave to Dr. Gould. It is proud that one of its sons has been enabled, long before his declining years have begun, to accomplish a work which is certainly the greatest that has been accomplished in the days of science thus far (applause).

I suppose there is no science which so touches the popular mind as astronomical science. It deals with immensities, with great mysteries, with unfathomable space and illimitable time. And yet its agencies, its methods, are the most laborious, patient, repulsive one might almost say, of those of any science with which I am acquainted. When it comes to observing the passage of a star across twenty wires in the field of the telescope with the utmost accuracy and precision, and doing that many times over for each star, and doing it for twenty thousand stars, the infinity of this patient labor is strongly impressed upon our minds. When the declinations of countless stars are to be observed, and observed so as to read through a microscope every time with the greatest accuracy, we have another immense labor of the same character. Then there are hundreds of thousands of logarithms to be taken and tables to be consulted, and immense columns

of figures to be added together, every time without a mistake. Then there are the proof sheets of fifteen quarto volumes to be read without a mistake. When all this is considered—the intense labor required and the routine character of the labor, the patient, minute accuracy which is absolutely necessary at every point—I think we may fairly consider that the progress into infinity is one of the most laborious that can well be imagined. The achievement of Dr. Gould represents labor—patient, persistent, exhausting labor—which it is impossible to describe. The University congratulates him upon the work so ably accomplished, welcomes him to home and friends, and wishes him new fields of productive labors (prolonged applause).

The Chairman, in introducing DR. OLIVER WENDELL HOLMES, who was to be the next to extend his congratulations to the honored guest of the evening, pleasantly referred to him as not a small star, but one of the first magnitude. Dr. Holmes received just such a welcome as he is entitled to, and which is always accorded him, and in response thereto read the following poem, which was received with round after round of applause:

A WELCOME TO DR. BENJAMIN APTHORP GOULD.

Once more Orion and the sister Seven
 Look on thee from the skies that hailed thy birth—
 How shall we welcome thee, whose home was Heaven,
 From thy celestial wanderings back to earth?

Science has kept her midnight taper burning
 To greet thy coming with its vestal flame :
 Friendship has murmured, "When art thou returning?"
 "Not yet! Not yet!" the answering message came.

Thine was unstinted zeal, unchilled devotion,
 While the blue realm had kingdoms to explore —
 Patience, like his who ploughed the unfurrowed ocean,
 Till o'er its margin loomed San Salvador.

Through the long nights I see thee ever waking,
 Thy footstool earth, thy roof the hemisphere,
 While with thy griefs our weaker hearts are aching,
 Firm as thine equatorial's rock-based pier.

The souls that voyaged the azure depths before thee
 Watch with thy tireless vigils, all unseen —
 Tycho and Kepler bend benignant o'er thee,
 And with his toy-like tube the Florentine —

He at whose word the orb that bore him shivered
 To find her central sovereignty disowned,
 While the wan lips of priest and pontiff quivered,
 Their jargon stilled, their Baal disenthroned.

Flamsteed and Newton look with brows unclouded,
 Their strife forgotten with its faded scars —
 (Titans, who found the world of space too crowded
 To walk in peace among its myriad stars).

All cluster round thee — seers of earliest ages,
 Persians, Ionians, Mizraim's learned kings,
 From the dim days of Shinar's hoary sages
 To his who weighed the planet's fluid rings.

And we, for whom the northern heavens are lighted,
 For whom the storm has passed, the sun has smiled,
 Our clouds all scattered, all our stars united,
 We claim thee, clasp thee, like a long-lost child.

Fresh from the spangled vault's o'erarching splendor,
 Thy lonely pillar, thy revolving dome,
 In heartfelt accents, proud, rejoicing, tender,
 We bid thee welcome to thine earthly home.

The REV. JAMES FREEMAN CLARKE was introduced as not only a clergyman whose calling it was to point out to men the way to heaven, but also an astronomer himself.

Dr. Clark said :

It gives me great pleasure to say a word in honor of our friend, the eminent astronomer, who is our guest to-night. To me, astronomy seems the queen of sciences, the science of sciences—that in which all others culminate. Geology carries us back in the history of the earth during hundreds of thousands of years, and then turns us over to astronomy for its previous record. Chemistry, analyzing the substances found below, proceeds by the spectroscope to detect the gases which flame in the sun and stars. Mathematics, having applied its powerful calculus to bring earthly phenomena to judgment, passes on to the heavens and compels stars and systems to disclose their secrets. By exact processes, and advancing from law to law, it weighs the planets in scales and the sun in a balance, and predicts the moment years hence when the curve of the moon's orbit shall carry it over the face of the sun and make a total eclipse. Then we take our telescope and go to Iowa or Kentucky and wait the appointed

hour, and when it arrives, the obedient meteor comes, the sun disappears, a black moon is seen in the sky, surrounded by the dazzling snowy light of the corona. By noticing, year after year, the abnormal oscillations of a far-off planet, Leverrier discovered another, invisible to the eye, and wrote to his brother astronomer to look for it with his telescope in a certain locality, and there it was found, as the long processes of calculation had predicted. In this study, the human mind rises above the passions of earth into the pure, cool region of a divine order. Mr. Emerson said that, coming out of an anti-slavery meeting, he looked up at the stars, and they seemed to say: "Why so hot my little man?" To the astronomer a thousand years are as yesterday when it is passed, or as a watch in the night. We look out on the midnight sky, and we see an infinite order; we gaze into immeasurable spaces and incomprehensible distances. In astronomy, the reason reveals to us as unquestionable truth what the imagination is incapable of apprehending. As a theologian, I thank astronomy for having elevated the conception of the Deity to a height which transcends dogmatism and makes our narrow notions of the heavenly government seem puny and ridiculous.

What heroism there is to-day in science! How its calm enthusiasm creates another noble army of martyrs. In pursuit of knowledge Burton, Speke, Stanley, take their lives in their hands, and go into the pestilences and among the savage tribes of African deserts. In pursuit of knowledge Kane and Franklin, Hayes and Greely, plunge into the Arctic solitudes and darkness, and encounter fierce cold and the horrors of starvation. They deserve the honors they receive. But equally devoted, though often unhonored, are those who pass long nights, while we are

comfortably sleeping, in patient exploration of the skies. They spend years of toil, with small reward, except in the consciousness that they are engaged in a noble work. The problems are not all solved; those that now task the highest thought of astronomers are among the most interesting of all, the singular qualities and movements of the comets, the source by which the sun renews its force while forever pouring out such torrents of light and heat, the strange nature of the ether, so attenuated as to penetrate the most solid bodies, yet so rigid as to throb like a steel wire with every undulation of force.

We are on the verge of still greater discoveries than any yet made, and our own country is prepared to do its full part in the work. When the Russian government wishes for a better telescope than any now in Europe, it sends to Cambridgeport to get it. Mr. Rutherford invents an instrument which gives us the best photographs of the moon ever made. The Washington Observatory discovers the two satellites of Mars. Prof. Langley, in the midst of Pittsburg smoke, has made observations with instruments of his own invention, with an account of which he is now arousing great interest among the scientists of England. Dr. Peters, of Clinton, N.Y., and Prof. Watson, of Ann Arbor, have been the chief discoverers of the asteroids. Prof. Young and Harkness first gave, in 1869, the true theory of the solar corona. The two Bonds, at the Cambridge Observatory, have taken rank among the chief astronomers of our time. Our friend, Prof. Pickering, amid all his other labors, has invented instruments of precision by which the light of the stars can be measured with accuracy. And now we welcome home Dr. Gould who has given long years of labor in a far-off land, away from home and friends, to complete his great work of a catalogue

of the southern stars. To him and to his noble wife who shared his labors, sustained his courage, was his companion in his sacrifices, we give our thanks and our love to-night. We sympathize with him in that great loss, and we thank God with him that he and she had this great opportunity, and that they were able to share together, side by side, the consciousness of doing a work which will never be forgotten.

When the applause which followed Mr. Clarke's address had subsided, Mr. Saltonstall introduced Mr. FRANCIS PARKMAN, the historian. Mr. Parkman said :

Something more than forty years ago, Mr. B. A. Gould, ex-master of the Boston Latin School, and Dr. Parkman, minister of the New North Church, took counsel together, and agreed that their sons, who had just passed the freshman examination at Harvard, should be joined in the bonds of chumship. This union, brought about by the parents, between two boys who had never seen each other, was the foundation of the beginning of a life-long friendship. Its beginnings were a little breezy (laughter). On one occasion Mr. Gould came out to pour oil on the troubled waters, and he, with humorous seriousness, told us that chumship was like matrimony — it requires a great deal of forbearance on both sides. In consequence of this remark, harmony was soon restored on both sides, and has continued unbroken until the present day.

Here the speaker referred to incidents which took place in No. 9 Holworthy, where he and Dr. Gould roomed.

Some of them were very humorous. In conclusion, Mr. Parkman said :

All of us who knew our classmate felt that there was in him the making of an eminent man of science, and if the veil of the future had been raised from before our eyes, we should not have been surprised to see through the vista of years the distinguished astronomer who is our guest to-night.

I see one here, said the Chairman, who, as long ago as 1840, was a teacher at Harvard, and who does not look a day older at the present time than he did then. I will now introduce to you, and it gives me great pleasure in so doing, PROF. JOSEPH LOVERING, of Harvard College. Prof. Lovering said :

Mr. Chairman, — I think you have been pushed if you are driven to this extremity for speakers. I read the programme for the literary exercises of this evening, and I saw nothing of this sort. I would not, however, be backward in adding my humble tribute to the congratulations of this evening. This scene recalls to me an occasion almost a generation ago not unlike this. It will be remembered by astronomers that Sir John Herschel is held in high esteem, not only for his zeal in promoting astronomical science, but for his devotion to the reputation of his father, which led him to almost exile himself at the Cape of Good Hope for three years in order to supplement the survey which his father had already made of the various nebulae of the northern heavens. The results of his labor were published in one large quarto volume. When Sir John Herschel returned

to London, he received the congratulations of the astronomers and of many others among the distinguished men of England. The present occasion may well recall that, but instead of a single quarto volume we are now likely to have, from the survey of the southern heavens, after the work of Dr. Gould is fully published, fifteen large quarto volumes. The President of the University has pointed out with clear emphasis the remarkable contrast in the two phases of the astronomer's life—the sublimity of his general survey of the heavens, as contrasted with the minute, laborious details of his occupation. We therefore recognize the great labor that has been done by Dr. Gould, and also the sacrifices that he has made in banishing himself from his friends and from his home, not simply for three years, but for fifteen years. I am very happy, therefore, to join with my pupils at the head of the table, and with the other friends of the college, and with my friend, the presiding officer on this occasion, in offering my congratulations to Dr. Gould for the great work he has accomplished (prolonged applause).

Now, remarked President Saltonstall, Dr. Gould has just said to me, in reply to a question, that he has never worked at the Observatory of Cambridge, though he believes he has worked at almost every other observatory in the world. That being the case, we will hear a few words from PROF. E. C. PICKERING, the Director of Harvard College Observatory.

Mr. Chairman,—I shall not make any technical statement regarding the results attained by Dr. Gould. In the admirable

description he has given us this evening he has covered every point but one, and upon that only shall I speak. I refer to the appreciation of his work at other observatories. Dr. Gould's account of his determination of the light of the southern stars has been brief. Let no one, therefore, imagine on this account that the *Uranometria Argentina* is a small or unimportant piece of work. An examination of the volume will at once dispel any such idea. It forms a large quarto of nearly five hundred pages, and gives an accurate determination of the light of 7756 stars. This catalogue is in constant use at Cambridge, and a single copy proved insufficient for our needs. The worn, almost tattered condition to which all these copies have been reduced seems to me the highest compliment that can be paid by the Harvard College Observatory to the work of Dr. Gould. Some scientific books have become rare because the edition is too small, some are destroyed by fire or other accident, and many, alas, go to the paper mills and trunk factories. A new danger threatens these volumes. If used as constantly elsewhere as at Cambridge, the catalogues of Dr. Gould may have the fate, almost unprecedented in scientific literature, of having worn out.

HON. GEORGE S. HALE was introduced as a member of the Class of 1844, who would read a poem which had been written by him for the occasion. Mr. Hale said:

I can not deny the charge. Like the modern Lord Chancellor of the stage, if I had consulted myself, and had taken the best advice I could give myself, and had concluded to follow the recommendation which I suppose I

should give to a guilty client, I should plead guilty, and throw myself upon the mercy of the court. In making this confession, I must assume the whole burden of the offence and exonerate the Committee from any guilt or responsibility as accessories. But I did not propose in volunteering to read a few lines of verse, to rush in like the fool where an angel (Dr. Holmes) has just now so delicately trodden.

And there is another thing in which I wish to imitate those unfortunate gentlemen who stand upon the scaffold, by giving a little advice to the shining, whitening heads I see before me. If you desire, after you have passed the shady side of fifty, to ascertain the candid opinion of your friends as to your intellectual and literary capacities in this line, volunteer, in consideration of your great admiration for your old friend, to write and read a poem. Let an announcement of your rash purpose appear in the morning newspapers, and then on your way down town observe the attitude of your friends whom you meet and the comments which they make. The first, with a twinkle in his eye as you approach him, will say, "You, *you* going to write a poem?" Another will repeat the same, with a slightly different inflection of voice. Another will say—"Don't write in spondees, and make it two long, *too* long; you had better imitate Dr. Holmes, and put it into trochees,—make it two short, *too* short" (laughter and applause).

This, he said, was the extent of his offence.

BENJAMIN APTHORP GOULD.

Bright Argo brings a hero back,
 With tales of distant worlds and fair,
 Shining in skies beyond our sphere,
 Yet weighed and numbered by his care.

Bright with the light of Southern stars,
 He seems to wear a Southern cross;
 Fit token of the honors won
 Through toil and grief, and pain and loss.

The wanderer we welcome home,
 From far-off lands to us unknown,
 Which see, with pride, his name displayed
 On their bright skies, thus made his own.

But not alone "The Southern Crown"
 Shall cast its halo round his head;
 The stars he worshipped in his youth
 Their shining welcomes o'er him shed.

May their "sweet influence" give him rest;
 His be the honors they confer;
 And long unsaid the fated words, —

"E vivis cessit stelliger!"

May 6, 1885.

DR. WILLIAM EVERETT was next called on without warning. He responded in his usual brilliant and happy manner. His remarks were in a jocose strain, mingled with more serious allusions to Dr. Gould in his private relations. For these reasons, a more extended report of them appears inappropriate.

Following Dr. Everett, PROF. W. A. ROGERS of Harvard Observatory was introduced, and spoke of Dr. Gould's work as a scientist. His remarks were as follows:

It has been my good fortune, Mr. President, to have been occupied during the past fifteen years in work of a similar

character to that which has been done by Dr. Gould. My field of observation has, however, been for the most part, limited to a mere patch of the sky—to a narrow belt more than covered by the breadth of one's hand when projected upon the heavens; but Dr. Gould has, almost within a decade, made an accurate survey of the entire southern heavens. He has equalized our knowledge of the northern and southern celestial hemispheres. There is no exaggeration in the statement that the work which he has accomplished during the past thirteen years is without a parallel in the annals of astronomy.

First of all it needs to be said that in 1870 there was no Cordoba Observatory. I suspect, also, that it must be said that astronomers had at that time little faith in the fulfillment of plans which required that the Government of a South American Republic should persistently pursue, for a series of years, that wise, enlightened and liberal policy which has made the Argentine Republic a conspicuous example of the way in which a government may foster learning and research with the most encouraging results.

I do not know of a better way to give a clear idea of the magnitude of this work than by comparing it with similar work done previous to 1872.

There are in the northern heavens, between the north pole and a little distance below the equator, about 4500 stars visible to the naked eye. These stars have been observed with more or less regularity at various observatories since about 1750. Within the same limits there are about 95,000 stars as bright or brighter than the ninth magnitude, which are usually observed in narrow belts or zones, and such stars are usually referred to as zone stars. The bright stars are common to nearly all general catalogues, but

the positions of the fainter stars depend for the most part on two or three separate observations. Dr. Gould has formed two catalogues since 1872 — a general catalogue of stars extending to the south pole, containing 34,000 stars, and a catalogue of zone stars, numbering 73,000. These two catalogues represent about 250,000 separate observations. It is stated in one of the printed volumes that the chronographic register of the transits, the pointing of the telescope for declination, and the estimation of the magnitude have all been done by Dr. Gould personally. The distinct and separate observations involved in this work must certainly exceed 1,000,000. I suppose there must be several gentlemen present who have a realizing sense of what a million really means, but for myself I commonly say that it seems to me to be a very large number. Having made less than 50,000 observations during the time covered by Dr. Gould's observations, can you wonder that this work, which seems so far beyond the limit of human endurance, is at once my amazement, my admiration, and — I must add — my despair?

The whole number of stars in the two Cordoba catalogues is nearly three times as great as in any single catalogue thus far constructed; and it must be remembered in this connection, that the great catalogues of Lalande, of Bessel, of Argelander and of Schjellerup, represent the labors of a life-time. The total number of stars in all catalogues formed previous to 1870, is about 260,000 as against the 105,000 stars in the Cordoba catalogues.

But there is another comparison which may be made, which will reveal yet more clearly, not only the magnitude of the work which Dr. Gould has now finished, but the intense energy with which it has been pushed to completion. Since 1869 a confederation of fourteen observatories, situated in different parts of

the world, has been engaged in the accurate determinations of the positions of the 100,000 stars to the ninth magnitude, in the northern heavens. Up to 1882 a total of about 346,000 observations had been made. Considerable progress had been made in this work before Dr. Gould left this country for South America. His work, involving two-thirds as many observations as all others combined, is completed, and is all in the hands of the printer, while the actual formation of the catalogue to be issued under the direction of the Astronomische Gesellschaft, can hardly be said to have been begun.

It is given to but few men in a generation to conduct special researches of the highest order in science, to a successful conclusion within a brief period of time. The labors of Newcomb and Auwers in the establishment of a fundamental system of stellar co-ordinates, of Struve, Dembowski, Burnham and Stone, in double star measures, of Pickering in stellar photometry, of Langly in the study of solar physics, of Huggins in spectroscopic researches upon the direction of stellar motion, and of Hall and Ball, of Gill and Elkin in researches upon stellar parallax, are examples of the best work of this kind. To a large extent Dr. Gould, in addition to his work with the meridian circle, has diligently and thoroughly cultivated all these fields of research, and the amount of work which he has done in these directions is attested by the results published in the fifteen quarto volumes which have been either already published, or which are now passing through the press.

In commercial circles you *rate* men. In astronomy we *weigh* men. If the result of a critical study of a given series of observations is such as to create great confidence in their excellence, much weight is properly given to any other work done by the

person who has made the observations. We are always reasonably sure that any result given by such an observer is correct within the limits of the unavoidable errors of observation.

It is not always safe to forecast the judgement of another generation of astronomers with respect to the weights assigned to different observers by the present generation, but the instances in which there will be in the future a reversal of judgement, will be exceedingly rare. It was not needed that we should miss the personal presence of the incomparable Argelander in order to be sure that he will always be regarded as the prince of observers.

The larger problems of astronomy are yet to be solved. The laws of sidereal motion in space are as yet unknown. The notion that Alcyone is the central sun, around which all the stars in the heavens revolve, is probably but a pleasant fiction. The basis of the real discovery of the laws which govern the motion of the universe in space must be *well made observations at widely separated epochs of time.*

The contribution which Dr. Gould has now made in the data necessary for the solution of this great problem is of the highest value, and he may feel sure that the estimate which is placed upon it by his co-laborers will be the estimate in which it will be held to the end of time.

MR. ERVING WINSLOW, the Secretary of the Committee, and who had served under Dr. Gould in the Dudley Observatory and the United States Coast Survey, said, addressing Dr. Gould:

We have drawn you down here to our level to eat and drink with us, and we mostly are to go our ways in the narrow and

tedious paths of common life. You, who have already accomplished a work for science so great that it does not become me even to speak of it, are yet to commence a new career of perhaps greater fulfillment.

Pardon, O chief astrologer, a layman's horoscope !

It is into this life that you lift us up when we see you walking about these familiar streets, and know you for what you are, even though we are not able to appreciate the full value of your labors. As you gave me your greeting yonder, when I met you, and common words of kindness were said, you little knew how I felt once more the peace and dignity which invest your pursuits to those who live among,—perhaps even grow “meanly to admire,—mean things.” The clear, calm midnight air, the solemn stars, the awful quiet in which we marked the majestic progress of worlds past our watch tower, came back from the past. Your kind eyes, twinkling behind the spectacles, became very orbs, and from Court street I was taken up into the Courts of Heaven.

And now, dear friend and old master, of all the 23,725 dinners you have catalogued, we hope this the 23,725th may do more than create the ordinary comfortableness beneath your zone, and remain a fixed star of the first magnitude in your horizon. Translate our earthly rhymes into the music of the spheres; make such brilliancy as has sparkled here into cometary glory; turn our conversation into cosmic dust, and give—no, you cannot give, for the warmth of our welcome *has* all the glory of the solar caloric.

Speaking to the assemblage, Mr. Winslow said :

Mr. Chairman and Gentlemen,—The French proverb reads both ways, “The absent are right, and the absent are wrong.”

There can be no doubt to which class our friends not here to-night belong, yet, though apparently physically unfortunate, their hearts are in the right place.

Mr. Winslow then read extracts from letters from absentees, as follows :

Prof. ASAPH HALL. — I have delayed answering your invitation to the dinner of welcome to be given to Dr. Gould, hoping that I might attend, but I am sorry to say that it will not be possible for me to do so. By his energy, ability and perseverance, Dr. Gould has accomplished one of the greatest astronomical works of our time. I am very glad that the people of Boston are to give a recognition of such devotion.

Prof. NEWCOMB. — My appreciation of the honor of this invitation, and of the appropriateness of extending such a welcome to our distinguished fellow-citizen on his return, are so high that it is with great reluctance that I advise you of my probable inability to attend.

Prof. YOUNG. — I greatly regret that my engagements here are such as will prevent me from accepting your flattering invitation. It would give me the greatest pleasure in the world if I could participate in your welcome to one who, at such a sacrifice, has done so much for science and added such lustre to the American name.

Prof. COFFIN. — I regret deeply that I shall not be able to attend the dinner of welcome to Dr. Gould. He eminently deserves the welcome prepared for him, and were I present I should join in it most heartily.

Dr. THOMAS HUN. — I am, I believe, almost the only survivor of Dr. Gould's many friends in Albany. It would give me great pleasure to participate in the reception and dinner to which you kindly invite me. But, alas, I feel too old for such enjoyments, and must reluctantly decline.

Prof. WHITNEY. — It would give me great pleasure to help to welcome Dr. Gould back to his native land, to which I am glad to hear he is returning, but it would not be possible for me to leave home to join in the contemplated reception, and I shall have to content myself with sending my best wishes.

Mr. J. M. BATCHELDER. — As our planet has pursued its annual course in space 74 times since the dawn of my star, I am, much to my regret, obliged to give up the pleasure of joining in the congratulations to Dr. Gould. From my window I have constantly in view the granite columns that form the piers of his first telescope. They stand in the open field, bare to our northern star, fit emblems of the permanent and durable character of his arduous and valuable labors in the southern hemisphere.

Letters of regret for themselves, and congratulations to our guest, have also been received, said Mr. Winslow, from Hon. Robert C. Winthrop, Hon. Horace Gray, Rev. Phillips Brooks, Mr. Francis Blake, Prof. W. M. Davis, Mr. Gardner M. Lane, Dr. Samuel A. Green, Prof. John W. White, Dr. Gray, Prof. Alexander Agassiz, Rev. F. H. Bigelow, Hon. C. F. Adams, Jr., Mr. Henry Q. Hawley, Dr. H. P. Quincy, Mr. S. Hartwell, Hon. Martin Brim-